

RV Monitoring System Requirements

The system will consist of a method of displaying Battery Voltage, Fresh Water Level, Outside Temperature, and Inside Temperature on two 2 line by 20 character displays. One display is on the outside of the RV, mostly to monitor the water tank while filling, and one on the inside of the RV for easy access to the data while camping. Each display will have one button to cycle through the four displays and also to initiate the cycle mode that will display all the data in turn. In addition a 6th mode will be selectable via this button which will turn off the display and backlight. Both displays will present data independently. That is to say the outside display could be displaying “fresh Water Level” while at the same time the inside display could be displaying “Inside Temperature”. The system will always be on while +12 VDC is available to the RV either by the battery or shore power or even the Tow Vehicle if equipped and any battery cutoff switch is not in the cutoff position.

Hardware consists of:

A microcontroller PIC16F76 and associated interface logic.

Two Future Kit FK902, to sense water level in six locations positioned along the vertical surface of the fresh water tank.

One Velleman-kit K2570 to regulate the +12 VDC down to a 5 VDC rail for the digital logic.

Two Dallas Semiconductor DS1820 Digital Temperature Sensors. One positioned to measure the outside air and one positioned to measure the inside air. These should be placed out of direct sunlight to avoid erroneous readings.

Two Data Vision P124-4 (DV-2020X) Lcd displays. Two lines by twenty characters. I found these displays at <http://www.goldmine-elec-products.com/prodinfo.asp?number=G19319> for \$1.99 each.

Various connectors, switches, wiring, and hardware as required for installation into the target RV.

Software

The software is written in mikroBASIC and developed on the EasyPIC V7 development board. Available from MikroElektronika <http://www.mikroe.com/>

The structure of the software is as follows.

Main Program titled “RV Monitor System”

And four Modules

1. Battery Voltage
2. Fresh Water Level
3. Outside Temp
4. Inside Temp

Software elements functions.

Main Program.

All global Variables and required definitions and arrays are declared here before the code starts.

The code will monitor the selection switches and display the required data on the two displays. This element is also responsible for the Cycling of the display data in the “Cycle” mode. The turning of the displays off is also done in this section when selected via the Mode Button(s).

Battery Voltage Module

The software to read the Battery Voltage using one of the Analog to Digital converters is done in this module. The math required to convert the digital data into scaled volts and the conversion to a n ASCII text string is also done in the routine. Displaying of the data is done in this module on line two of the display.

Fresh Water Level Module

This module reads the input port with the six water sensors connected. It will then convert this data to a ASCII Text string suitable for displaying on the LCD displays. Displaying of the data is done in this module on line two of the display.

Outside Temp Module

This Module reads the digital data from the DS1820 Digital Temp Sensor located on the outside of the RV and converts the Degrees “C” to Degrees “F”. It then formats the data into an ASCII Text string suitable for displaying on the LCD displays. Displaying of the data is done in this module on line two of the display.

Outside Temp Module

This Module reads the digital data from the DS1820 Digital Temp Sensor located on the inside of the RV and converts the Degrees “C” to Degrees “F”. It then formats the data into an ASCII Text string suitable for displaying on the LCD displays. Displaying of the data is done in this module on line two of the display.

Button Selection sequence. The associated buttons will step through the following functions in this order.

Battery Voltage: Displayed in Volts DC

Fresh Water Level: Displayed as a progress bar with six levels of indication.

Outside Temperature: In Deg. "F"

Inside Temperature: In Deg. "F"

Cycle Mode: This mode continually cycles through the previous four Data Displays until the button is pressed again .

OFF: The unit does not turn off but the backlight and the Displayed Data for the given display are turned off.